

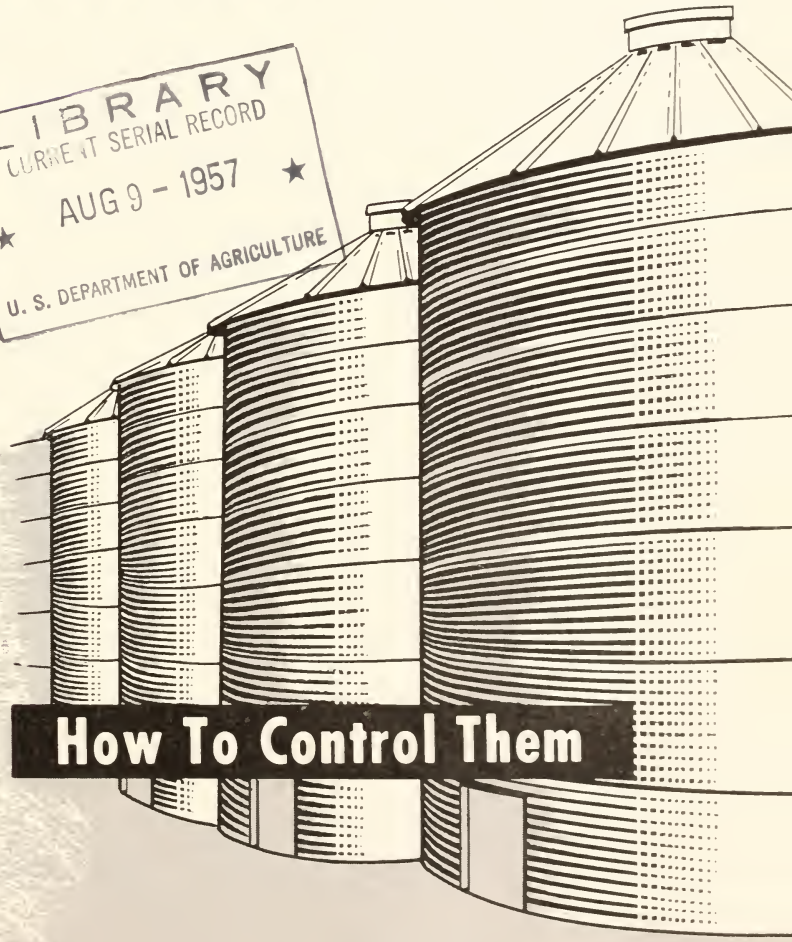
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INSECTS IN FARM-STORED WHEAT

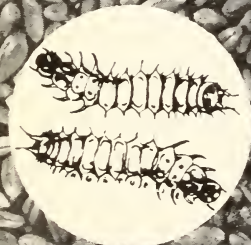
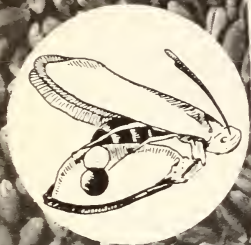
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U. S. DEPARTMENT OF AGRICULTURE



How To Control Them

Leaflet No. 345

U. S. DEPARTMENT OF AGRICULTURE



INSECTS IN FARM-STORED WHEAT

—HOW TO CONTROL THEM

Wheat in a bin is like money in a vault . . .

Are you protecting your cash from insects?

If you have wheat in storage on your farm, make sure the bin is what it should be—a place where the wheat is protected and preserved. Don't let it be a place where weevils, grain borers, and other granary pests eat away the wheat—and your income.

Insects in farm-stored wheat cost American farmers millions of dollars every year. The loss is preventable. It is waste. It hits the farmer in two ways:

First, some of the wheat is destroyed by the insects.

Second, some of it is made unfit for milling. Infested wheat may bring only feed-grain prices at the elevator. Weevil-infested grain is not accepted by millers for processing into flour, cereal, and other food products.

Wheat seldom contains insects when it comes from the harvest field. The job is to keep it free of insects when it is stored. Do these things:

1. Before storing the wheat, get rid of insects living in the bin or near it. Clean up. Use an insecticide.
2. Keep the wheat dry. Make the bin tight.
3. Protect the wheat. Apply a protective spray or dust, or fumigate the wheat.
4. Inspect the wheat regularly. Watch for insect buildup. Fumigate if necessary.

Let's find out more about each of these points . . .

A CLEAN START

Keeping insects out of wheat after it is stored is enough of a task. Don't make it harder by putting wheat into a bin where insects are waiting for it. Wheat is free from insects when it comes from the field; keep it that way.

Store wheat in metal bins that are easy to clean, or in properly constructed, weathertight wooden bins. The bins should be in a separate building. If a building in which grain is stored is constantly being entered for one purpose or another, it will be difficult to keep out rodents and birds.

In wooden bins, double walls and floors allow the accumulation of waste grain and grain dust that become infested with insects. They are difficult to combat under these circumstances.

Feed rooms or bins containing seed or poultry or animal feeds, stables, mangers, and animal feeders harbor

many insects that are likely to migrate to bins of grain. Wagons, trucks, combines, and other farm equipment containing accumulations of waste grain are all sources of infestation. Do not store grain near any of these danger points.

Clean out the bin at least a month before it is to be filled. Remove left-overs of old grain; sweep down the walls; sweep the floor. Remove accumulations of waste grain from under and around the bin. On the surface at least, the bin is now free from insects.

See what other places you can clean up, to prevent insects from migrating to the new grain. Clear trash and litter from the bin area. Insects live from season to season around farm buildings in spilled grain and accumulations of grain and feed. Cleaning up these places helps control not only insects, but also rats and mice.



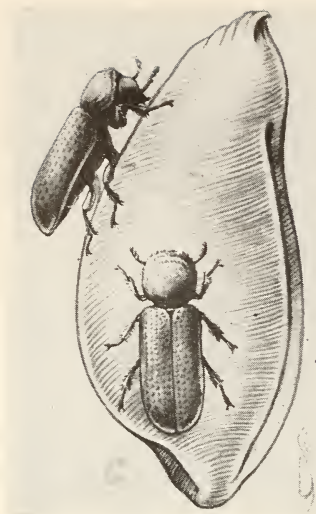
N-10050

Sweep down the walls.



N-10019

Sweep the floor.



BN-3062(C)

Adults of the lesser grain borer.



BN-3058(C)

Adult of the rice weevil.

Insects may be living in cracks or burrows in the walls and floors of wooden bins, where your cleanup can't reach them. Destroy them with an insecticide.

Prepare a spray containing 2.5 percent of methoxychlor, or 0.5 percent of pyrethrins.

Buy one of these insecticides in the form of a wettable powder or emulsifiable concentrate and mix it with water. The label will tell you how much to mix with water in order

to get a spray containing the desired percentage of insecticide.

Apply the spray to all surfaces inside the bin. Apply it at the rate of 2 gallons to 1,000 square feet. Use a garden sprayer or a power sprayer.

Sprays containing pyrethrins in combination with piperonyl butoxide (a chemical that increases the effectiveness of the insecticide) are available. If you use such a spray follow the manufacturer's recommendations.

DRY STORAGE

Granary pests like moisture with their grain. The less moisture stored wheat contains, the less attractive it is to insects.

Try to store the wheat when it is dry. If for some reason you have to store wheat with high moisture

content, check frequently to see whether insects are developing in it. The more moisture there is, the closer you have to keep watch.

Once the wheat is stored, keep it dry. To do this, you must have a tight, weatherproof bin.

How about the roof and side walls?
Will they keep out the rain and snow?

Can ground water and moisture get
through the foundation and floor?

Will doors and windows keep out
driving rain?

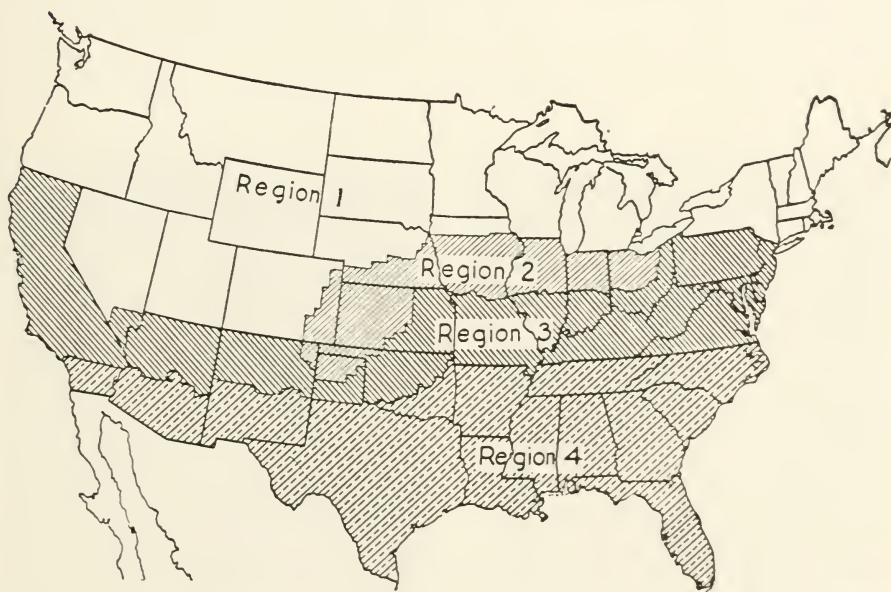
Does your bin have adequate venti-
lation?

Besides keeping out bad weather,
tight construction keeps out rats,
mice, and birds. If fumigation of the
bin becomes necessary, tight con-
struction makes that job easier and
more effective.

CHEMICAL PROTECTION

When you are satisfied that the
bin will keep the wheat dry, and that
insects in it and near it have been
destroyed, there is a further step
that you can take to ward off insect
infestation.

Apply a protective spray or dust
to the wheat before it is stored or
as it goes into the bin. Or fumigate
the wheat after it is in the bin. The
materials are sold where other agri-
cultural chemicals are sold.



BN-3889

The map shows, by regions, the degree to which farm-stored grain in the United States is subject to insect attack: Region 1, little if any damage occurs to wheat stored on the farm during the first season. Region 2, insects are troublesome during the first season in some years. Region 3, insects are troublesome every year. Region 4, insect control is especially difficult.

Protective Sprays or Dusts

Protective sprays or dusts are most useful in regions 2 and 3 (see map). Applied to newly harvested wheat at the time of binning, they give protection against insect infestation during the first storage season.

Two types of spray formulations are available on the market, both of which contain pyrethrum and piperonyl butoxide (a synergist). One type, with the insecticide dissolved in a solvent, comes ready mixed and is applied without further dilution. The other type comes as an emulsion concentrate and is diluted with water. The amount of water used does not affect the moisture content of the grain appreciably. Follow the manufacturer's directions in applying the sprays.

Several types of sprayers are available for applying these sprays. Some are simple hand sprayers that are easily operated. Other types have cylinders of compressed air, or motor-driven pumps.

The protective dusts contain pyrethrum and piperonyl butoxide diluted with wheat dust.

Both sprays and dusts can be applied to the grain at various times before it goes into the bin—as it comes from the combine, or as it is unloaded at the bin.

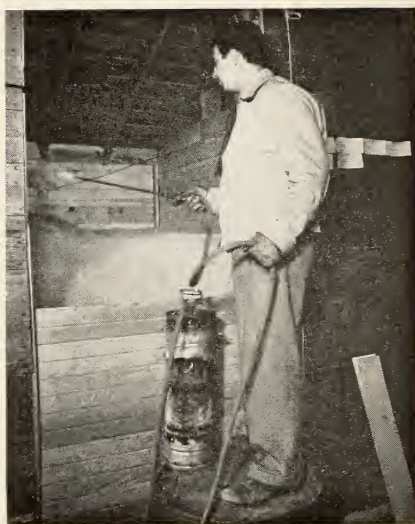
Treated Seed Grain

Most fungicides used to treat seed wheat are poisonous to human beings and animals. Therefore, never mix surplus treated seed with your market wheat—the whole lot may be condemned.



N-12680

Applying protective spray to wheat as it is binned.



BN-3733

Applying fumigant to farm-stored wheat with a hand sprayer.

FUMIGANTS

Kinds and Dosages

Fumigants are sold under various trade names. The ingredients are shown on the labels. The label on the fumigant you buy will probably show that it is one of those listed in the table below.

The table shows the ingredients in some readily available fumigants, and the recommended dosage for each fumigant.

Several other suitable fumigants are available. If you use one not on the list given here, follow the manufacturer's dosage recommendations.

How to Fumigate

First, level the surface of the wheat in the bin.

Then apply the fumigant as a coarse spray over the surface. Apply it evenly.

CAUTION.—Always apply the fumigant from outside the bin. Avoid inhaling the vapor. Avoid spilling the fumigant on the skin or clothing. If you get fumigant on your clothes, take them off immediately to prevent personal injury.

Small quantities of stored wheat can be fumigated quickly and effectively by applying the fumigant with a garden sprayer or a bucket-pump sprayer. If you use a garden sprayer—

Enlarge the opening in the spray disk to the diameter of an 8-penny nail; or

Remove the spray nozzle and substitute a nozzle made of a pipe one-fourth inch in diameter and 6 inches long; flatten the spray end.

To fumigate a large quantity of wheat, use a power spray pump that will take the fumigant directly from the container in which it is purchased.

All pump fittings should be of bronze, which resists the corrosive action of fumigants. Hoses and gaskets should be of plastic or synthetic rubber.

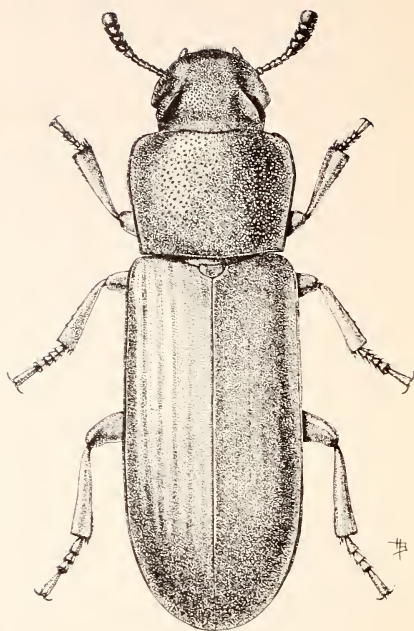
When to Fumigate

Fumigate within 2 weeks after binning the wheat if you live in region 4, and within 6 weeks if you live in region 2 or 3. If you live in region 1, fumigate when necessary to prevent insect buildup.

Fumigant	Gallons per 1,000 bushels	
	Wheat stored in a wooden bin	Wheat stored in a metal or concrete bin
Carbon tetrachloride (100%).....	6	3
Carbon tetrachloride-carbon disulfide (80%-20%).....	4	2
Ethylene dichloride-carbon tetrachloride (75%-25%)....	6	3
Carbon tetrachloride-ethylene dichloride-ethylene dibromide (60%-35%-5%).....	4	2



Adult of the saw-toothed grain beetle.



Adult of the confused flour beetle.

REGULAR INSPECTION

About every 30 days take standard probe samples from the center of the bin and inspect them for insects.

Sift the sample through a 10- to 12-mesh screen. The screen will hold back the wheat, but insects will sift through.

Fumigate at once if you find even one granary weevil, rice weevil, or lesser grain borer per quart sample of

wheat, or as many as five insects of other kinds (such as flour and grain beetles, cadelles, or grain moths) per quart sample. The fumigation procedure is the same as that described on page 7.

After applying the fumigant evenly over the entire surface, give an extra treatment to any areas where insects are especially numerous.

THIS LEAFLET was prepared by the Stored-Product Insects Section, Biological Sciences Branch, Marketing Research Division, Agricultural Marketing Service, United States Department of Agriculture.

Washington, D. C.

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